Critical Digest.

ANATOMICAL, PHYSIOLOGICAL AND PATHOLOGICAL NOTES.

By H. H. DONALDSON, Ph.D.

—***Contribution to the Surface Anatomy of the Cerebral Hemispheres.***—By D. J. Cunningham. With a chapter upon Cranio-Cerebral Topography, by Victor Horsley. With eight plates. Royal Irish Academy: Dublin, July, 1892.

At the present time the surface anatomy of the brain serves as the foundation for a number of speculations concerning character and the relation of mental to anatomical peculiarities. For the surgeon the relations between the encephalon and the enclosing cranium cannot be too carefully determined. This sumptuous "Cunningham Memoire," No. VII., discusses the same material from two points of view. Some fifty pages are occupied by Horsley with cranio-cerebral topography, while over three hundred are devoted by Cunningham to the title theme. This latter author examines the beginnings and development of the cerebral fissures and their relations to one another and to the skull during growth. For this he has studied a large number of fœtal human brains as well as those of children and adults and a good series from the primates.

The manner in which the fissures develop in the different orders of vertebrates and the failure of the human brain to pass through stages typical of lower orders, in the course of its own development, shows that fissuration has but a limited phylogenetic value, so that while it is possible, to a very slight degree, for the human brain to exhibit ape-like features, it is not possible for it to exhibit such as are carnivorous, because it does not pass through such a stage. This fact justifies the author in setting the limitations which he does to his research, and not going beyond the primates for comparison. The individual fissures could be studied equally well on brains removed from the skull or *in situ*. When, however, it was to be determined whether, as a result of growth, a given fissure had shifted its position in relation to other fissures or to the skull, it was of the greatest importance that the brain should be fixed undistorted in its normal position. The method by which this was accomplished in this instance, the preparation of a large number of specimens by the removal of the skull bones except along the line of the sutures, and the large number of beautiful casts taken from these preparations, and represented in the plates, are in themselves sufficient to give unusual value to the paper. Cunningham chooses the most important features on the brain surface for his present discussion, thus taking up the complete fissures of the human cerebrum, the Sylvian fissures and the island of Reil, the fissure of Rolando, the intraparietal sulcus and the præcentral and other sulci on the external surface of the frontal lobe, in the order given. In estimating the value of surface peculiarities, it is assumed that ape-like characters are indicative of low development, that characters found in the developing brain represent a lesser perfection than is found in the adult, and that there is a normal and general arrangement of these fissures which may be designated as the dominant type, deviations from which are important in proportion to their degree and the rarity of their occurrence. Not only is note taken of the changes due to age, but comparison is made between the two halves of the same brain, between the sexes, and with negro brains and those from the apes. All measurements are made comparable by being given in the form of percentages—the standard being taken from the brain itself. The results thus obtained are comparable with one another in a way that would not be possible if absolute figures were alone given. Each of the five chapters is furnished with a summary of the results, and from these we shall select a few by way of illustration :

From about the end of the second to the end of the fourth month of fœtal life the human cerebrum exhibits transitory fissures on both the mesal and lateral aspects. These are complete fissures in the sense that they cause a distinct fold of the mantle projecting into the ventricle. They appear to be caused by a disproportion in the growth of the mantle and the enclosing bones. Cunningham suggests that while the skull bones show a quadrupedal pause, the hemispheres are developing the occipital lobe, which is most emphasized in man, and as a result of this increased activity in the growth of the mantle these fissures occur. In support of this idea is the fact that they occur only rarely, if at all, in orders below the primates. How far they occur in monkeys is not known. Their disappearance is a curious process. Cunningham is of the opinion, based on measurements, that these fissures do not disappear by a simple process of unfolding, because the area of the mantle formed by the fissures thus smoothed out would be greater than it is in fact found to be. He therefore infers that a certain amount of absorption takes place at the bottoms of these fissures while they are in process of being smoothed away. (Retrograde processes occur in the development of the nervous system, but I do not know that we have in other instances such a process interpolated between two periods of growth. The explanation, therefore, deserves close examination.)

The period at which these fissures disappear coincides with the appearance of the fornix and callosum. On the mesal aspect the fissures have in the main a radial arrangement, and this persists to some extent when the callosum fails to develop. In this instance, then, it is possible that the development of the callosum is the cause of the disappearance of these transitory fissures.

Though in general the term transitory applies properly to them, yet in some cases they persist, and thus form the complete fissures of the cerebrum, *i. e.*, such fissures as are accompanied by a protrusion of the mantle into the ventricles. The complete fissures in the human brain are the ventral part of the arcuate fissure, the cephalic part of the calcarine, in many cases the parieto-occipital, and in some cases the mid-collateral. The Sylvian fissure is not a complete fissure.

Cunningham homologizes the transitory "external perpendicular fissure" with the ape-fissure of the monkeys. This is more satisfactory than Eberstaller's homology of the "anterior occipital fissure" with the same. It follows from Cunningham's view that the ape-fissure is not represented in the adult human brain. To the variations in the fissures limiting the cuneus a good deal of space is given, and the whole discussion forms an admirable example of the way such a feature should be studied. Having recognized the constituent elements—the subdivisions of fissures and the gyri more or less sunken in them—all the cases found can be classified according to the degree in which the fissures are interrupted by these same gyri.

It appears that the dorsal end of the parieto-occipital fissure occupies a tolerably constant position, both on the surface of the cerebrum and in relation to the cranial sutures. In the fœtus and child it is slightly further in front of the lambda than in the adult.

In next discussing the Sylvian fissure, the peculiarities of its formation are considered. The limbs of this fissure are gaps between the several opercula, which here cover over the insula. These opercula are enumerated as the fronto-parietal, the frontal, the orbital, and the temporal. The peculiarity of Cunningham's description lies in the emphasis put on this frontal operculum, which may or may not be developed. In the former case there are formed both an anterior ascending and an anterior horizontal branch. In the latter case there is only a single branch; but, strictly speaking, this represents not one, but both the branches mentioned. In the case of the insula, the correspondence of the furrows on it with those of the mantle is pointed out, and its change of position with relation to cranial wall is measured. It lies more under the parietal and less under the frontal bone in the adult than it does in the fœtus.

In studying the fissure of Rolando, the stability of its position on the surface is brought out. Its position is the same in both sexes and both hemispheres. The angle of this fissure is determined as 71.7°, and here again there is no sexual difference, but in brachycephalic heads the angle becomes larger. If there is any sexual difference in the length of this fissure it is in the females, in whom it is the longer.

It appears that the interparietal sulcus in the apes and in man does not hold the same relations to the fissure of Rolando. In man this last appears earlier than the interparietal and is deeper than it. In the apes the reverse is the case. This would suggest that its value in the two cases was not the same. It seems probable, further, that in the type of the interparietal sulcus there may exist differences of both sexual and racial value.

Of the two extra furrows which are recognized in the frontal lobe—namely, the one dividing the superior and that dividing the middle frontal gyrus—it is only the latter which has established itself on the brain of the chimpanzee. The negro brains which he examined also resembled that of the chimpanzee in this point.

Owing to the absence of the frontal and orbital opercula in the apes, the Sylvian fissure does not in them possess anterior limbs—the so-called anterior limb corresponding to the anterior free border of the fronto-parietal operculum.

Victor Horsley's discussion of the cranio-cerebral topography takes up many points—especially some neglected ones—and treats them from the standpoint of variations due to cephalic index, age, race, sex, and pressure distortion.

Whatever difference of interpretation may be possible for certain of the results obtained, the prime fact remains that the methods of observation and measurement employed throughout this investigation give these results a permanent value, and both future investigators and present surgeons in this field must consider them.

PSYCHOLOGICAL NOTES.

BY WILLIAM O. KROHN, PH.D.

The University of Chicago has already expended one thousand dollars upon apparatus for its laboratory in experimental psychology.

The Regents of the University of California are about to report favorably upon an appropriation to enable Prof. Howison to splendidly equip a laboratory in experimental psychology at that institution. At present Leland Stanford University is the only institution west of the Rocky Mountains that enjoys facilities in this line, there being but one other laboratory besides this west of the Mississippi, that of the University of Nebraska, at Lincoln.

—***Dermal Smell and Taste Sensations in Paralytics.***—(Untersuchungen über das Verhalten der Hautsensibilität, sowie des Geruchs- und Geschmacksinnes bei Paralytikern. Von S. Kornfeld und G. Bikeles. Jahrbücher für Psychiatrie. Elfter Band, III. Heft.)

In the literature of psychiatry it is generally stated that, as a rule, paralytics experience a general anæsthesia. So state Savage, Mendel, Kraepelin, and others. Kornfeld and Bikeles have made numerous researches, testing paralytics with reference to three things: first, the sensibility of the skin and its ability to localize; second, the sense of smell; third, the sense of taste.